WETLANDS/SHORELINES

PRIORITY HABITATS/SPECIES

FISHERIES ISSUES

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Objectives

- What are the key resources in the study area?
- Where are they located?
- How will they be affected by the project?
- Are there opportunities to avoid, offset, or rectify impacts?

Definitions

Wetlands -

- vegetated lowlands (marshes and swamps)
- rivers, streams and other ‘waters’

Shorelines -

- areas bordering large water bodies
- shorelands extending 200 feet from the shoreline edge

Priority Habitats and Species

- Bald eagle breeding & foraging
- Riparian areas
- Urban natural open space
- Peregrine falcon
- Green-backed and great blue herons
- Western pond turtle
- Purple martin

Screening Criteria
Wetlands/Shorelines

- Quantify potential direct effects
- Qualitatively assess impacts to wetland functions
- Evaluate habitat connectivity for wetland-dependent wildlife

Screening Criteria
Priority Habitats and Species

- Identify potential direct effects to individual habitats and species
- Qualitatively assess severity of impacts
- Evaluate potential difficulties with Endangered Species Act compliance

Regulatory Context

- Corps of Engineers permit required for wetland fill
- Satisfy federal Endangered Species Act requirements
- Comply with State laws for water quality, in-water work, shoreline management
- Comply with local ordinances

Key Areas

Portage Bay/Union Bay-

- Foster Island/Arboretum wetlands
- Bald eagle breeding habitat
- Pond turtle habitat
- Breeding areas for green-backed herons

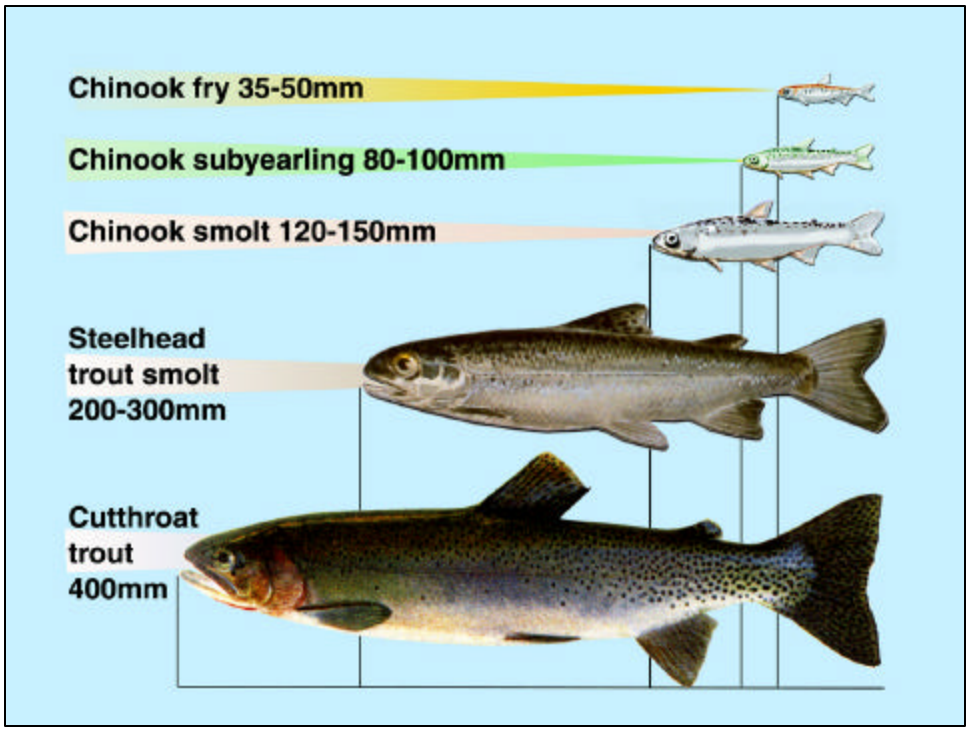
LISTED SPECIES

- **CHINOOK**
  - **Puget Sound ESU *(T)***
- **BULL TROUT**
  - **native char *(T)***

- **NOT LISTED**
  - **coho**
  - **chum**
  - **sockeye**
  - **steelhead**
  - **cutthroat trout**

ANADROMOUS SALMONID LIFE STAGES

- Anadromous: migrate to ocean and return to spawn in freshwater
  - Juvenile Rearing
  - Juvenile Migration
  - Adult Migration

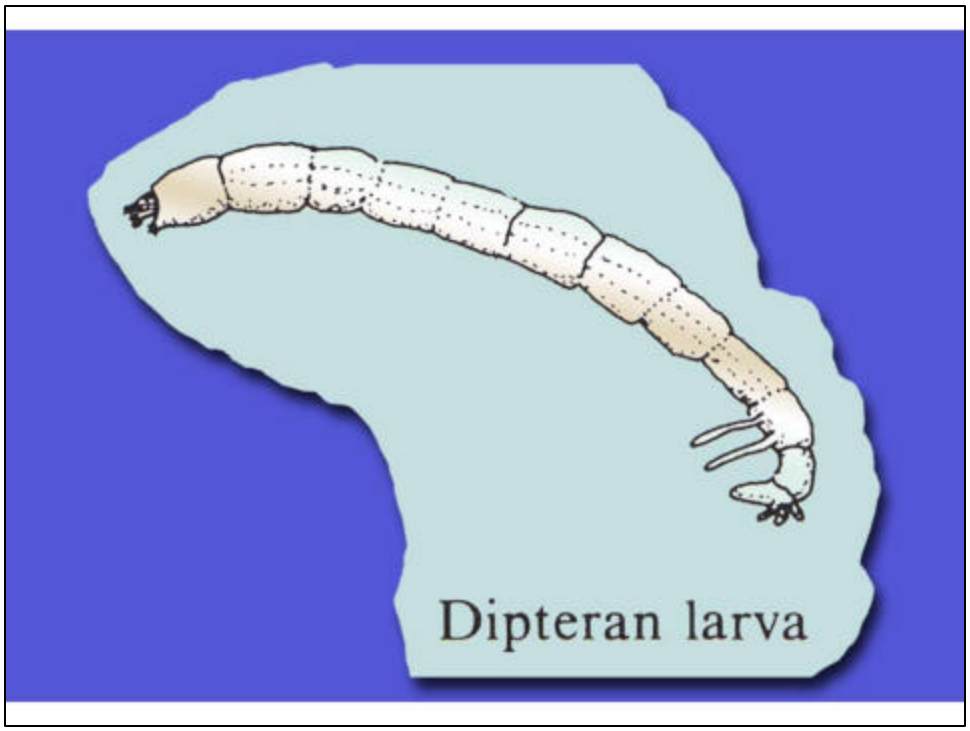


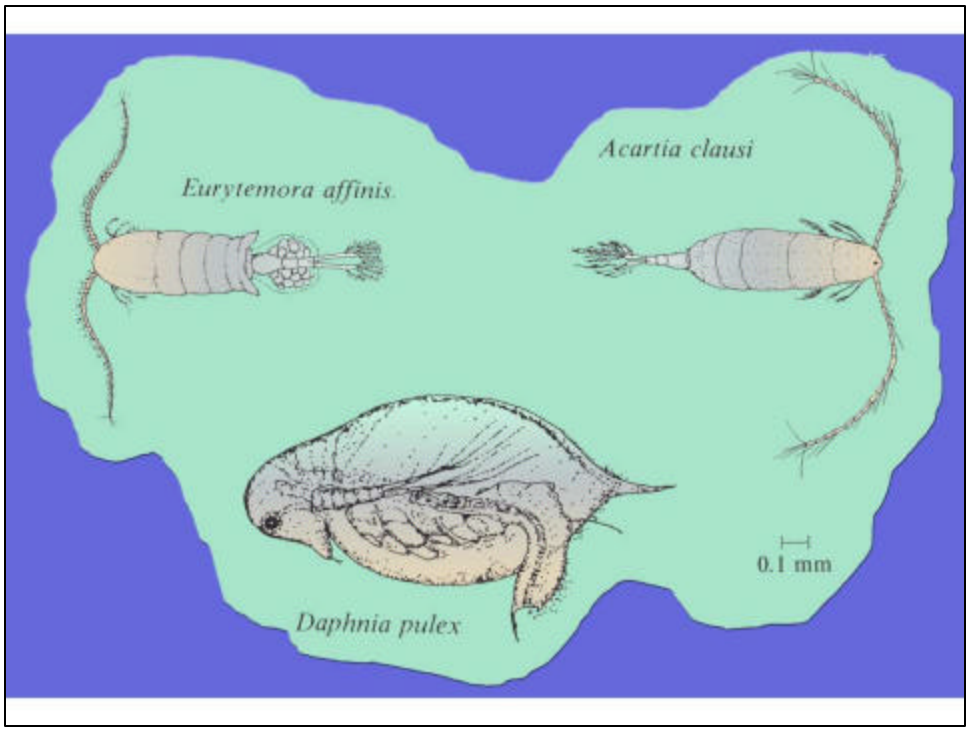
LAKE WASHINGTON JUVENILE REARING HABITAT

- Depth: generally less than 3 ft deep.
- Substrate: sandy gravel
- No aquatic vegetation
- Basic “swimming beach” type conditions
- Other habitat types likely increase predation

JUVENILE SALMON PREY

- Lake Washington: primarily chironomid larvae
- Also *Daphnia*, copepods


Dipteran larva


Eurytemora affinis
Acartia clausi
Daphnia pulex
0.1 mm

ADULT SALMON

- generally not feeding
- may hold following passage of locks
- temperature >21 ° C block migration
- migrate quickly through ship canal and lake to near streams
- bridges no apparent affect
- spawning areas not directly affected

IMPACTS
LAKE WASHINGTON

- Portage Bay - Union Bay area, effects primarily predator/competitor habitat
- raise bridge height above water, reduced number piles
- ship canal tunnel crossing
- east shoreline crossing could produce more of habitat desired by young chinook

Key Areas

East of Lake Washington -

- Wetlands and bald eagle breeding habitat at Yarrow Bay and Cozy Cove
- Fairweather Creek wetlands
- Mercer Slough wetlands and heron habitat
- Riparian wetlands on Kelsey Creek & Richards Creek
- Goff Creek & Valley Creek wetlands

Key Areas

Sammamish River and Bear Creek-

- Pond turtle, bald eagle and purple martin habitat on Sammamish River
- Riparian wetlands
- Bear Creek restoration site

EAST SIDE STREAMS

- chinook downstream in Kelsey Creek
- several culverts on small streams that could improve passage for other salmonids

BEAR CREEK

- Rearing/Migration corridor
- Juveniles migrating through lower portion of stream in late spring
- Riparian habitat important to maintaining natural characteristics of stream
- Recent restoration area
- Transportation corridor encroachment on riparian habitat likely ESA issues

IMPACTS BEAR CREEK

- chinook producing stream
- encroachment into narrow riparian area along lower end of stream
- likely water quality and habitat impacts to migration corridor and possibly rearing habitat

SUMMARY - FISHERIES

- all alternatives have same type of impacts, a matter of degree
- differences in width of shoreline crossings, and encroachment of Bear Creek riparian habitat
- water quality impacts do not differentiate, wider roadways, more water to be treated

Summary of Wetland Impacts by Alternative

	Alternative							
Wetland Category	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Category I	0	3.7	5.9	7.8	6.9	10.3	6.6	7.7
Category II	0	0	1.4	1.4	1.4	1.4	1.4	1.4
Category III	0	0.9	8.4	8.2	8.3	9.6	8.3	8.2
Category IV	0	0	1	0.4	1	0.4	0.9	0.3
Total	**0**	**4.6**	**16.7**	**17.8**	**17.6**	**21.7**	**17.2**	**17.6**

Summary - Wetlands

- Wider footprint means greater impacts
- Impacts range form 4.7acres (Alt 2) to 21.6 acres (Alt 6)
- Alternatives 3 through 8 rated “most”
- Alternative 2 has least impacts, but HCT affects Bear Creek and Sammamish River

Summary-Wetlands

- Large wetlands with important social value
- Potential impacts to existing restoration and mitigation sites
- Wetlands associated with salmon streams
- Impacts may be difficult to mitigate

Priority Habitats and Species Impacts by Alternative

Impact	Alternative							
	1	2	3	4	5	6	7	8
Portage Bay & Foster Island		X	X	X	X	X	X	X
Fairweather Bay, Cozy Cove, Yarrow Bay		X	X	X	X	X	X	X
Bear Creek			X	X	X	X	X	X
New bridge over Bear Creek		X	X	X	X	X		
New bridge over Sammamish River		X	X	X	X	X		

Summary - Priority Habitats and Species

- Strongly correlated with wetland impacts
- Alternatives 2, 3, 5 and 7 rated “medium”
- Alternatives 4, 6 and 8 rated “most”
- Feasibility of mitigation low for all Alternatives, except 2 and 3

Summary - Priority Habitats and Species

- Association with wetlands and streams increases permit complexity
- Potential impacts not limited to habitat modification (indirect effects)
- Habitat elements must be incorporated into wetland/stream mitigation efforts